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(54) Method and device for forming and transferring groups of cigarettes on a packing machine with multiple wrapping lines

(57) A method and device (1; 1') for forming and transferring groups (13) of cigarettes (7) on a packing machine (2) with multiple wrapping lines (20'), whereby each group (13) is fed into a respective pocket (11) of a conveyor (10), and presents a number of superimposed layers (9) fed successively into the respective pocket (11) by push elements (14) for successively expelling the layers (9) from the bottom of respective outlets (4) of a feedbox (3); the outlets (4) are equal in number to the number of layers (9) forming each group (13) multiplied by a whole number greater than one, and the conveyor

(10) is moved intermittently in steps of a length equal to the spacing between two consecutive pockets (11) multiplied by the whole number; at each stop of the conveyor (10), respective layers (9) are expelled from the outlets (4) of the feedbox (3) and fed into respective pockets (11); and respective groups (13) are expelled from a number of pockets (11) equal to the whole number, and are fed to an operating unit (20) of the packing machine (2).

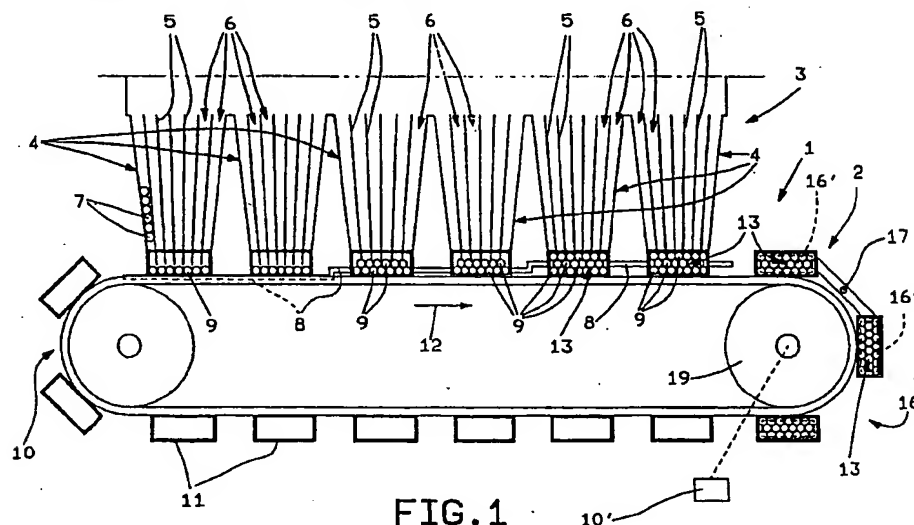


FIG. 1

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direction crosswise to their axes down each channel 6, and the bottom cigarette 7 in each column is deposited onto a plate 8 located beneath respective outlet 4 and at a distance from outlet 4 just slightly greater than the diameter of cigarettes 7.

On plates 8, which are located beneath respective pairs of adjacent outlets 4 and at different levels increasing from left to right in Figure 1 by a height substantially equal to the diameter of a cigarette 7, there are formed, in the course of each operating cycle of device 1, respective side by side pairs of layers 9 of cigarettes (Figure 1) at a level just below the bottom end of respective outlets 4.

To the side of plates 8 (Figure 2), there extends the top branch of a conveyor belt 10, which is driven in steps by a known drive element shown schematically by block 10', and is fitted with equally spaced pockets 11. Each pocket 11 extends crosswise to the traveling direction, indicated by arrow 12 in Figure 1, of the top branch of conveyor 10, and is positioned with its input end facing plates 8.

At each step of conveyor belt 10, each pocket 11 is fed forward by a distance equal to twice the spacing between two consecutive pockets 11, so as to come to a stop in front of each plate 8 and successively receive three layers 9, which, as pockets 11 travel past feedbox 3, are superimposed one on top of the other inside pocket 11 to form a group 13 of cigarettes 7 constituting the content of a packet (not shown).

At each stop of conveyor belt 10, each layer 9 is fed into respective pocket 11 by a pusher 14, which is connected integral with a cross member 15 moved back and forth by actuating means (not shown) in a horizontal direction perpendicular to direction 12, and is located, in a withdrawn idle position, on the opposite side of feedbox 3 to conveyor belt 10. Pusher 14 is movable between said withdrawn position and a forward position in which six push plates 14' of pusher 14 engage the space between the bottom ends of respective outlets 4 and respective underlying plates 8. In known manner (not shown), pusher 14 in the forward position is located with the free ends of push plates 14' contacting respective ends of layers 9 of cigarettes just fed into respective pockets 11.

A pusher 16, connected integral with a cross member 17 moved back and forth by actuating means (not shown) in a horizontal direction perpendicular to direction 12, is located, in a withdrawn idle position, on the opposite side of feedbox 3 to conveyor belt 10. Pusher 16 is movable between said withdrawn position and a forward position in which, at each stop of conveyor belt 10, two push plates 16' and 16" of pusher 16 axially engage the space inside two consecutive pockets 11 containing respective groups 13 of cigarettes and located at a portion of conveyor belt 10 downstream from feedbox 3 in direction 12. Preferably, said portion of conveyor belt 10 is curved, by comprising a portion of conveyor belt 10 looped about a transmission pulley 19.

In actual use, when six successive pockets 11 of

conveyor belt 10 are arrested in front of respective outlets 4, pusher 14 is operated by cross member 15 so that push plates 14' engage the space between respective outlets 4 and underlying plates 8, and push respective layers 9 into respective pockets 11.

At the end of each operating cycle of pusher 14, the two pockets 11 at outlets 4 to the right in the drawings contain respective groups 13, which, in the course of successive steps of conveyor belt 10, are brought into the operating region of pusher 16.

At each stop of conveyor belt 10, pusher 16 is operated to expel respective groups 13 of cigarettes 7, by means of respective push plates 16' and 16", from the two pockets 11 facing it, and to feed said groups to an operating unit of packing machine 2, comprising, for example, a conveying or wrapping device shown schematically by block 20 and comprising said two wrapping lines 20'.

Device 1 for forming and transferring groups 13 of cigarettes 7 therefore provides for fully achieving the object of the present invention, i.e. for enabling highly rapid operation, by individually forming and transferring, at each operating cycle of packing machine 2, the layers 9 eventually forming part of two groups 13, and by simultaneously transferring two groups 13 to unit 20.

Device 1 for forming and transferring groups 13 of cigarettes 7 may be applied to packing machines featuring more than two wrapping lines by simply arranging matters so that outlets 4 of feedbox 3 are equal in number to the number of layers 9 in each group 13 multiplied by a whole number greater than one; that conveyor belt 10 is operated intermittently in steps of a length equal to the spacing between two consecutive pockets 11 multiplied by said whole number; that, at each stop of conveyor belt 10, respective layers 9 are expelled simultaneously from outlets 4 of feedbox 3 and fed into respective pockets 11; and that, at each stop of conveyor belt 10, respective groups 13 are expelled from a number of pockets 11 equal to said whole number, and supplied to said operating unit 20 of packing machine 2.

Conveyor belt 10 may also be powered to operate in steps of a length equal to the spacing between two consecutive pockets 11, in which case, pushers 14 and 16 are operated at alternate stops of conveyor belt 10.

Figure 3 shows a device 1' by way of a variation of device 1, and the component parts of which are indicated, wherever possible, using the same numbering system as for the corresponding parts described in connection with Figures 1 and 2.

In device 1', conveyor belt 10 is fitted with a number of equally spaced pockets 11, preferably with as small a spacing as possible; the six outlets 4 of feedbox 3 are divided into two identical groups 21, each comprising three side by side outlets 4 parallel to direction 12; when conveyor belt 10 is arrested, and in the same way as described with reference to Figures 1 and 2, the bottom output ends of outlets 4 of each group 21 are positioned facing respective nonconsecutive pockets 11 alternat-

8. A method as claimed in any one of the foregoing Claims from 1 to 6, characterized in that the outlets (4) of said feedbox are divided into a number of sets (21) equal to said whole number; the spacing between the outlets (4) in each said set (21) being equal to the spacing between said pockets (11) multiplied by said whole number; and, when said intermittent conveyor (10) is stopped, each pair of said sets (21) being separated by a number of pockets (11) equal to said whole number.
9. A device for forming and transferring groups of cigarettes on a packing machine with multiple wrapping lines, characterized in that each said group (13) is fed into a respective pocket (11) of a conveyor (10), and comprises a number of superimposed layers (9) fed successively into the respective said pocket (11) by push means (14) for successively expelling the layers (9) from the bottom of respective outlets (4) of a feedbox (3); said outlets (4) being equal in number to the number of layers (9) forming each said group (13) multiplied by a whole number greater than one; the device (1; 1') also being characterized by comprising drive means (10') for moving said conveyor (10) intermittently in steps of a length equal to the spacing between two consecutive said pockets (11) multiplied by said whole number; said push means (14), at each stop of said conveyor (10), simultaneously expelling respective layers (9) from the outlets (4) of said feedbox (3), and feeding said layers (9) into respective said pockets (11); and further push means (16) being provided for expelling respective groups (13), at each stop of said conveyor (10), from a number of pockets (11) equal to said whole number, and supplying said groups (13) to an operating unit (20) of said packing machine (2).
10. A device for forming and transferring groups of cigarettes as claimed in Claim 9, characterized in that said whole number is two; said packing machine being a packing machine (2) with two wrapping lines (20').
11. A device for forming and transferring groups of cigarettes as claimed in Claim 9 or 10, characterized in that said further push means (16) operate at a curved portion of said conveyor (10).
12. A device for forming and transferring groups of cigarettes on a packing machine with multiple wrapping lines, characterized by comprising push means (14) for transferring single layers (9) of cigarettes from a feedbox (3), containing a mass of cigarettes, into pockets (11) of an intermittent conveyor (10), said groups (13) being formed by superimposing said layers (9) as said conveyor (10) moves forward; and further push means (16) for transferring said groups (13) from said pockets (11) to said wrapping lines (20').
13. A device as claimed in Claim 12, characterized in that the number of outlets (4) relative to each layer (9) equals the number of said wrapping lines (20').
14. A device as claimed in Claim 12 or 13, characterized in that, at each step of said intermittent conveyor (10), at least two groups (13) of cigarettes are formed, and as many groups (13) are transferred to said wrapping lines (20').
15. A device as claimed in any one of the foregoing Claims from 9 to 14, characterized in that the spacing between the outlets (4) of said feedbox (3) equals the spacing between said pockets (11) of said intermittent conveyor (10).
16. A device as claimed in any one of the foregoing Claims from 9 to 14, characterized in that the outlets (4) of said feedbox are divided into a number of sets (21) equal to said whole number; the spacing between the outlets (4) in each said set (21) being equal to the spacing between said pockets (11) multiplied by said whole number; and, when said intermittent conveyor (10) is stopped, each pair of said sets (21) being separated by a number of pockets (11) equal to said whole number.

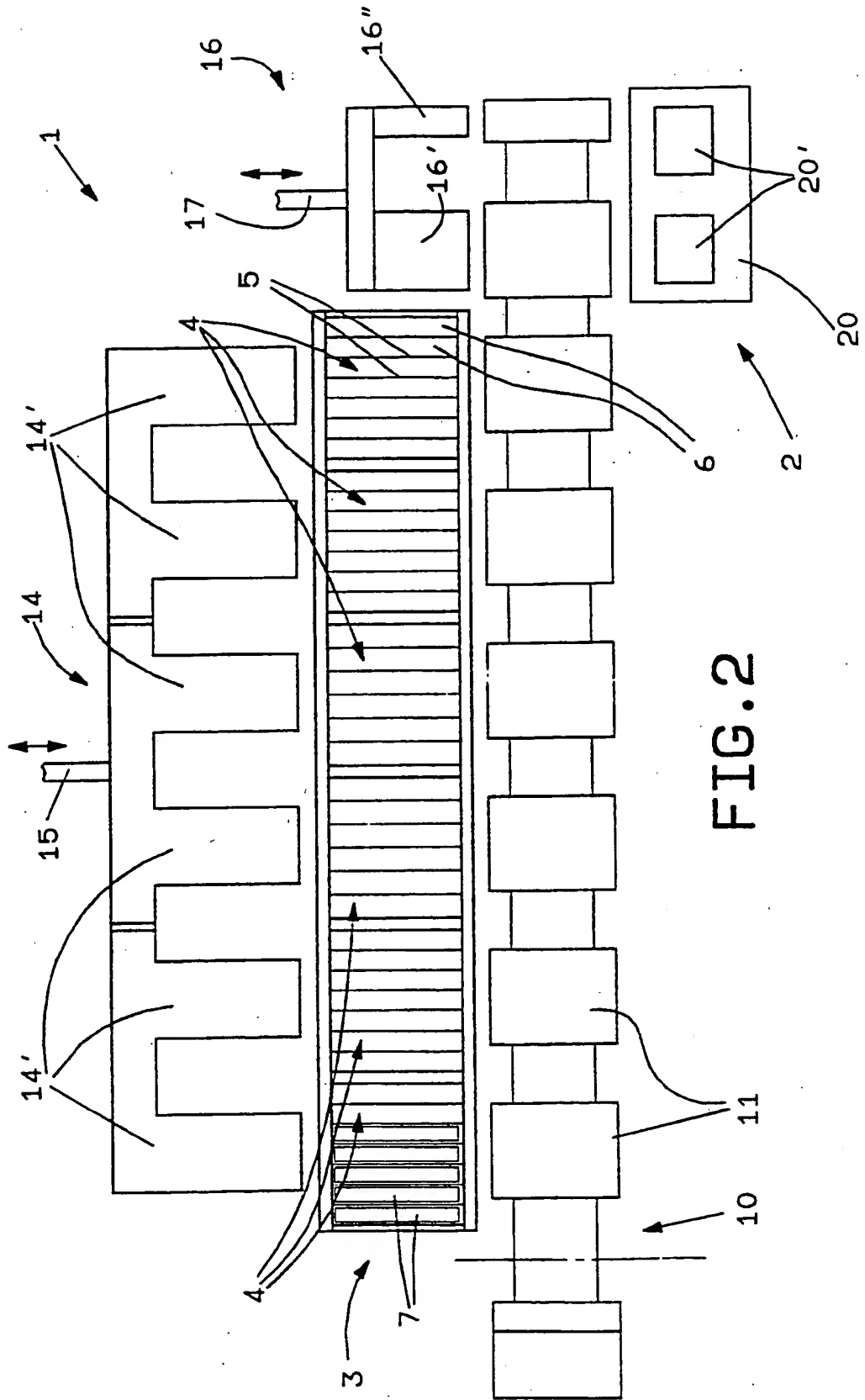


FIG. 2



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EUROPEAN SEARCH REPORT

Application Number
EP 96 11 5304

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
Y	EP-A-0 142 803 (MASCHINENFABRIK ALFRED SCHMERMUND) 29 May 1985 * claim 1; figures 1,2 *	4,7,12,15	B65B19/10
A	---	1,9	
Y	DE-A-24 54 289 (MOLINS) 22 May 1975 * page 11, paragraph 2 - page 12, paragraph 2; figures 1,2 *	4,7,12,15	
A	---	1,9	
A	FR-A-2 532 618 (G.D.) 9 March 1984 * page 5, line 13-25; figures 1-3 *	1-3,7-11,15,16	
			TECHNICAL FIELDS SEARCHED (Int.Cl.6)
			B65B
The present search report has been drawn up for all claims			
Place of search THE HAGUE		Date of completion of the search 2 December 1996	Examiner Grentzius, W
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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